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I Love My 80m Loop!

And you will, too!

Much has been printed over the years on loop antennas. Experimenting with wire antennas is a favorite pastime for me. I recently had such great results with a delta loop on 10 meters and a rectangular loop on 20 meters (50+ countries in 3 weeks of casual operating!) that I decided to take the plunge and put up an 80 meter full-wave horizontal loop that would allow operation on all HF bands.

After gleaning all the info in the articles referenced below, and adding my own twist, the antenna would either work or be a "cloud-burner." I am happy to say that this simple antenna far exceeded my expectations! What I found to be so appealing about this antenna was that it was fairly economical and easy to build and install, works on all HF bands, and requires no special feed networks — only a transmatch, coax, and some space!

80-meter horizontal square loop

The length of a full-wave 80-meter loop is about 270 feet (1005 divided by frequency in MHz), or about 67 feet per side. I use "about," because exact numbers are not that critical according to my results. In my opinion, when constructing antennas, not only is the old saying "the higher the better" true, but "the longer the wire the better" may also fit some loops. Since I live on 10 acres in the country, I decided to make my horizontal loop longer to start with to better fit my backyard. So, my "longer" loop is about 1.25 wavelengths on 80 meters (2.5 on 40m, 5 on 20m and 10 on 10m) and is installed between 30 and 40 feet in the air.

Scaled-down versions, say 75% of a wavelength, may also work fine if you don't have the room for a full-wave or longer antenna. According to antenna experts, a circular loop is "ideal," but impractical for most hams. I found a square — or even a rectangular loop — is easier on the pocketbook and muscles to put up, and would provide about the same results.

To support my loop made from salvaged telegraph line wire from the Yukon Territory (just think about the stories this wire has already told!), I used my 50-foot-tall tower and three masts, each 35 to 40 feet long, made from 2-inch galvanized water pipe. Each support is "supported" by one 1/4-inch-diameter steel guy wire attached by a U-bolt in the opposite direction of the wire's "pull" and a small pulley with 3/8-inch-diameter rope for hoisting up the wire to the top of masts (**Photo A**).

The telegraph wire is #6 AWG copperclad steel and not all that easy to work with, but the price was right. For the feedpoint connection I used a 1-1/2" PVC pipe T terminating the antenna wires to a 1/4" eye bolt as used on some commercially made baluns. RG-213 coax (chosen for strength and durability, and because I may use an amplifier) terminates on the eyebolt nuts with two flat washers (**Photo B**). The coax is taped to a ten-inch-long bottom extension of the PVC T to remove strain on the

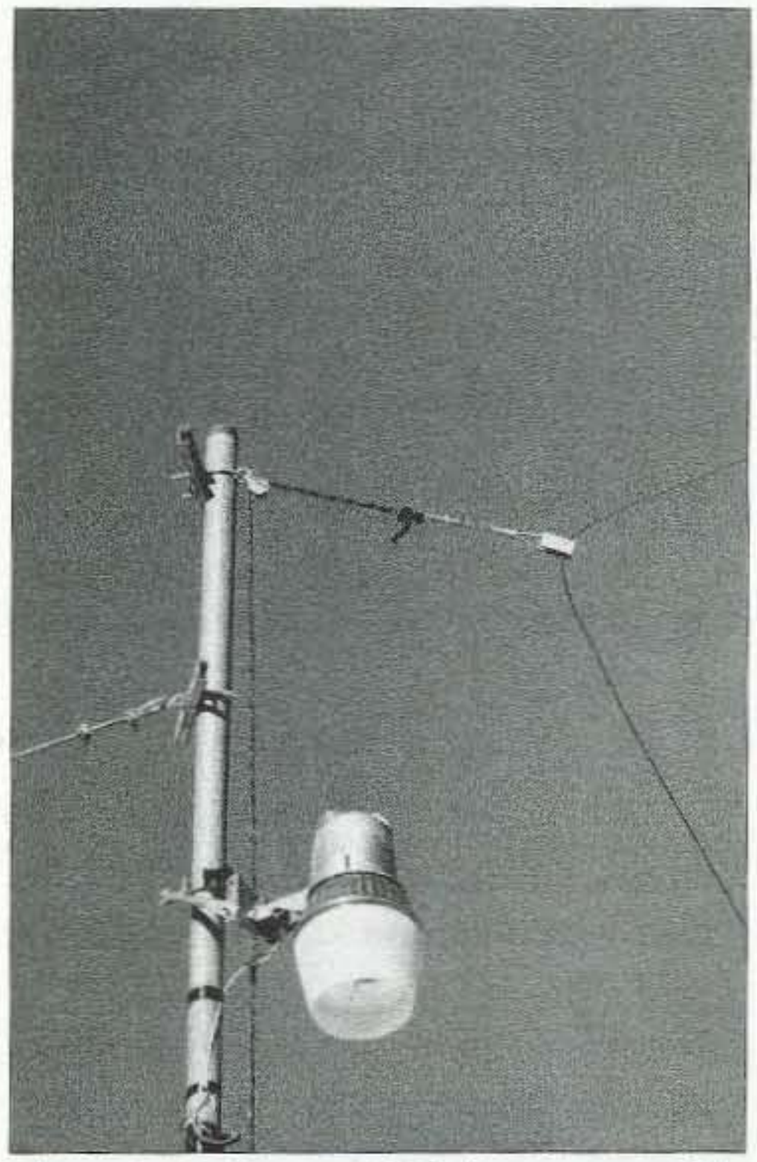

Photo A. *Pulleys and U-bolts are two of the tools you will need in erecting this antenna.*

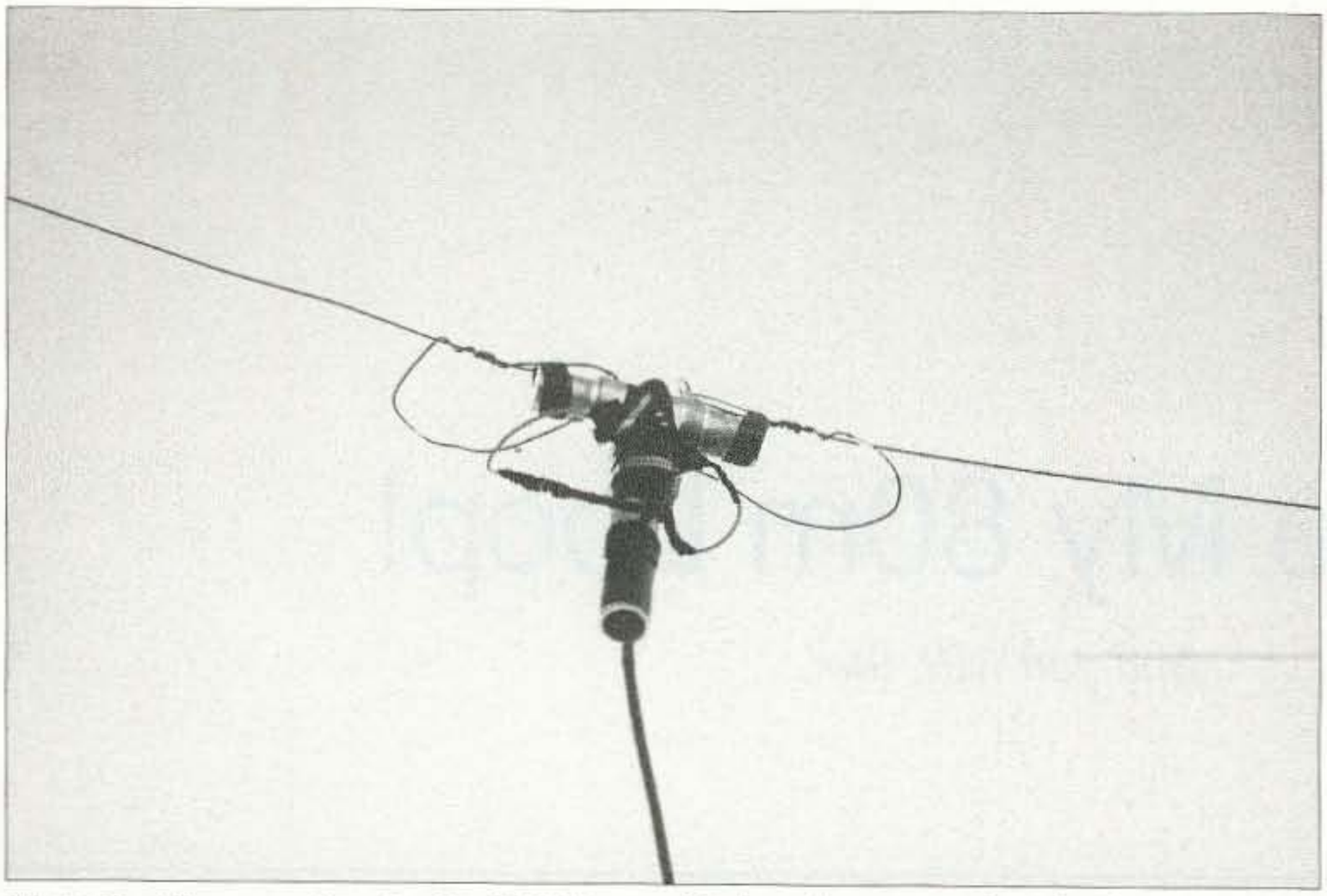

Photo B. *All connections in this PVC T assembly have been treated with silicone caulk to ensure that they are weatherproof.*

hanging coax. Silicone caulk was then applied to the connections for weatherproofing. For antenna insulators, I used porcelain electric fence insulators. Once the support masts, complete with guy wires (**Photo C**) and pulleys, are installed, raising the wire becomes a one-man operation.

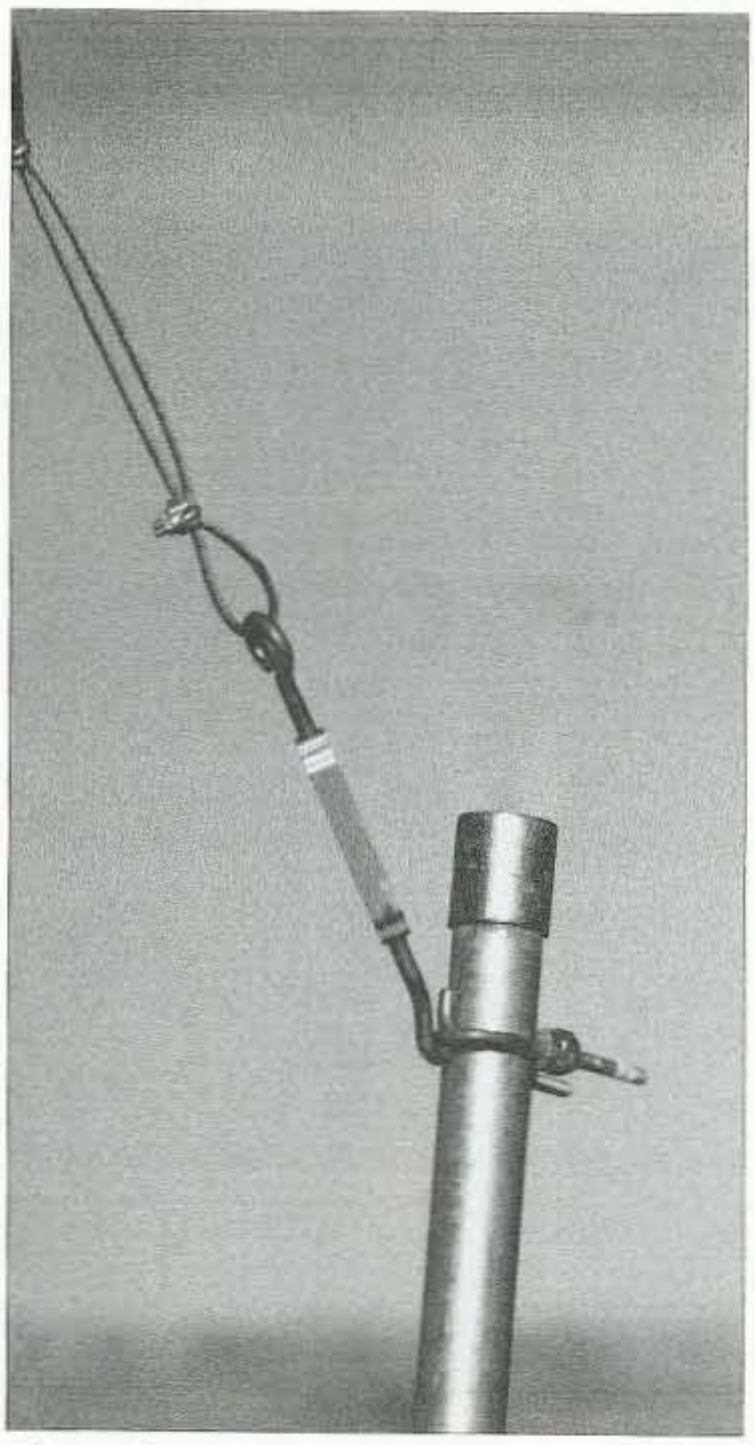

Photo C. *Guy wire assembly.*

On my tower, I installed a six-foot-long 4x4 painted wood post hanging off near the top of the tower for one of the four required supports (**Photo D**). On the post end that is farther away from the tower I used an electric service entrance insulator fastened by U-bolt to "float" (ref. *ARRL Antenna Book*, page 5–17) the antenna wire as with the other three supports. I wasn't sure if all "floaters" would actually allow the wire to float, but they did quite easily.

The wire antenna and feedline connections were made up on the ground and then hoisted up each mast one-by-one with the rope and pulley. Once the wire was in the air and about a foot or two away from the masts, I merely tied off the rope to whatever was handy (e.g., nearby barn roof, tree, etc.). I only had to take up a bit more slack from one pulley (the wire pulls through all the pulleys) for final wire sag adjustments. Since my wire was very heavy-duty, I could pull it tight. Your sag will depend on the type and size of wire used. Smaller-gauge wires will break if pulled too tight or used on long spans — just ask me! My loop is fed about midspan and the coax drops 30 feet straight down into my shack.

How does it work?

During the first three months of use (October through December), 75% of my QSOs on 10 and 20 meters were either 5x7 or 5x9 reports "both ways." About 75% of them were with stations outside North America (about 10% were 5x9 +20!), and about 20% of the total Qs were 5x5 to 5x1 quality "both ways." For those doing the math, call the remaining 5% split equally, 3x3 signals, or simply "no contact at all" (you can't work them all!). Also, my log indicates a "sent" report was the same as "received" most of the time. I even broke several big pileups on the first or second call.

Directivity? Well, the loop seemed to work just fine equally in all directions (I'm still scratching my head!). That's what I really like about this loop!

Gain, you ask? Well, some, depending on your choice of feedline and how high you install your antenna. L.B. Cebik W4RNL goes into a lot of detail on gain (see #4) in his article, so I won't get into that here. Although I have tried this antenna mostly on 10 and 20 meters, I was also pleased with a weekend of experimenting on 15 and 17 meters. DX worked on 15 meters: KL7, HL5, JR1, KHØ, RV9, and BD4. DX worked on 17 meters was KL7 and OH1. Many Ws and VEs were also worked on 15 and 17 meters. Both bands produced about the same results on signals mentioned above over the two-day period of tests. I am confident this antenna will produce good results on 40 and 80 meters as well. I know it tunes 40 and 80 meters quite fast! To give a better perspective on this versatile antenna, on December 29, 2001, I worked my buddy Rick KL7AK back-to-back on 15, 17, 12, and 40 meters! On 15 and 17 meters, we both exchanged 5/9 + 20 reports; on 12 and 40 meters we were up to 5/5 quality. Not bad for a piece of wire, eh?

I did learn however, both 300 watt manual tuners (MFJ and Vectronics) I used took some time to tune the loop, with a couple of bands requiring a lot of patience! I did not try the auto-tuner on my TS-570D since my Tucker 1.5 kW tuner easily handled the job quite fast

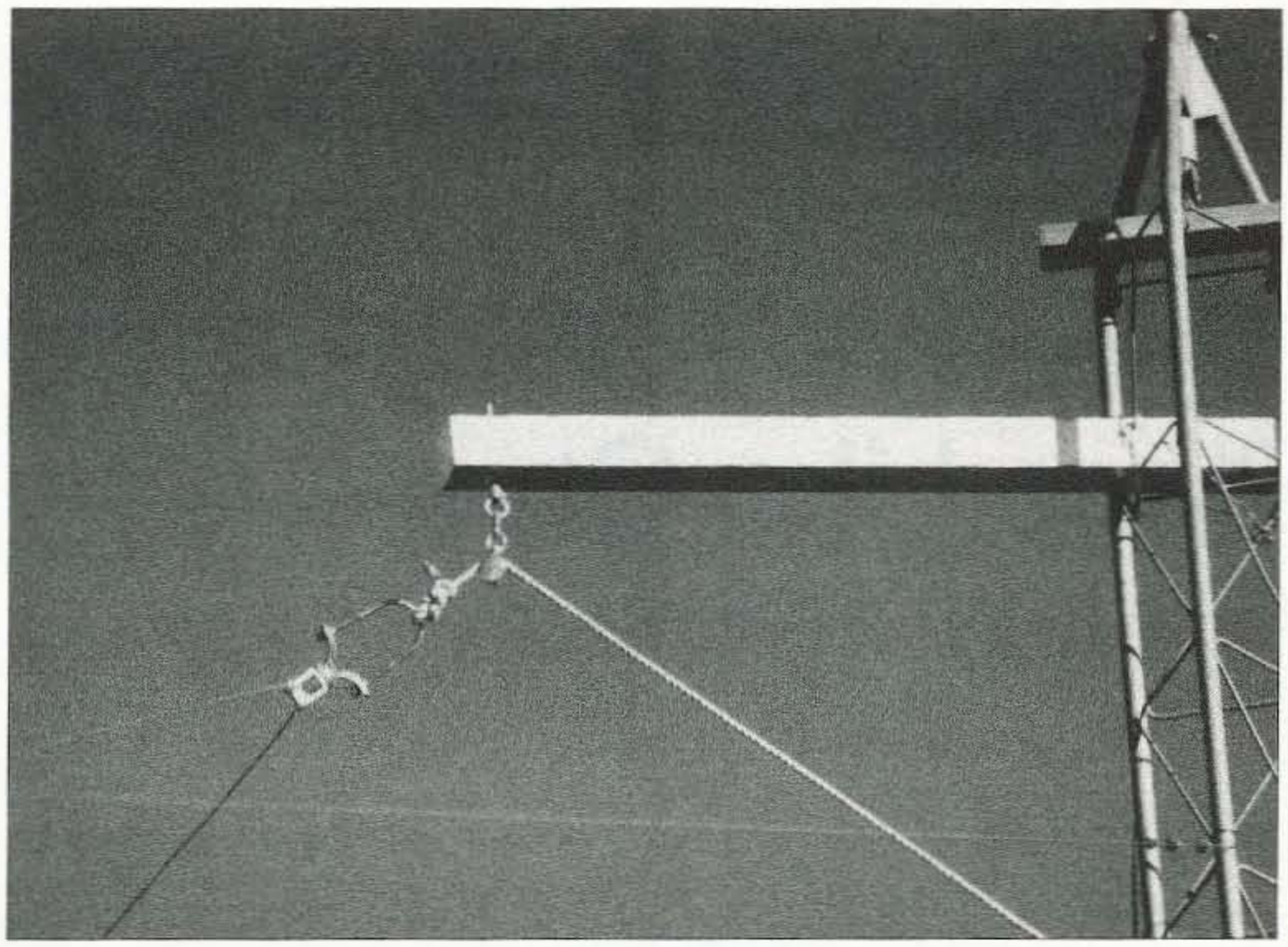

Photo D. One of the four required supports.

on all bands 80–10 meters. My tribander will remain stored in my garage as I work on a new loop design around 1,200 feet long supported off of 60-foot-tall power poles (but that's another article!) — when I tire of this antenna, that is! I highly recommend this antenna. Good luck with your antenna experimenting! Any and all feedback (*) is appreciated.

*I worked all over the USA and Canada, including: KL7, KH6, JY4, V47, KHØ, WP2, WP3, HP1, FO, PA2, 8R1, DS3, G3, LU1, ON7, JA (all), DU1, I2, ES1, UA9, and UA6 to name a few!

References

1. "The Loop Skywire," by WØMHS, *QST,* Nov. 1985, page 20, and *ARRL Antenna Book 16th edition,* page 5–16.

2. "The Droopy Loop," by KJ7MZ, *QST,* July 1996, page 57.

3. "Loop Antennas," *ARRL Antenna Book,* 16th edition, page 5–1 (note: #1 is available for download from the ARRL Web site: do "search" for "constructing loop antennas").

4. "HO-HO-HOHPLs," by W4RNL [www.cebik.com/atl1.html].

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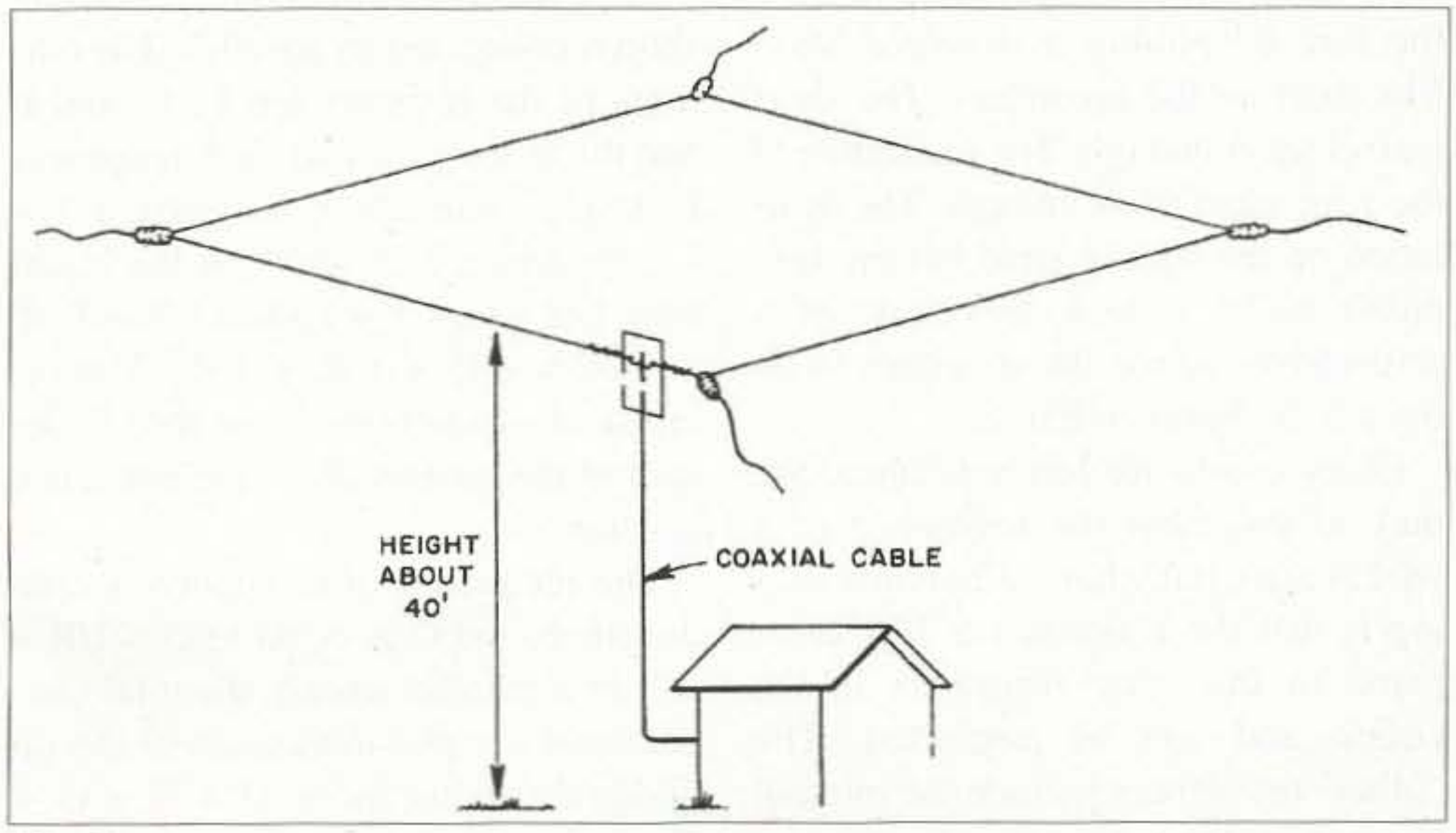

Fig. 1.